

## REMARKS/ARGUMENTS

Applicant responds herein to the Office Action dated March 24, 2005.

Claims 1-11 stand rejected on grounds of obviousness over Moslehi (U.S. 5,405,444), in view of Mezey, Sr. (U.S. 6,331,212) and Mimura et al. (U.S. 4,567,352). Reconsideration is requested in view of the following remarks.

As previously indicated in applicant's Amendment filed December 21, 2004, one characteristic of claim 1 of the present invention is that a light shield is provided to block flashlight emitted from a flash lamp from reaching an inner surface of the chamber. Further, the flash lamps perform flashlight irradiation of considerably high intensity in an extremely short time period of about 0.1 to 10 milliseconds, to instantly heat the substrate up to 1,000 to 1,100°C. Such an extremely intense flash light irradiated on the inner surface of the chamber may cause the formation of an oxide film which disadvantageously becomes a source of contamination, as described at page 2, lines 16-20 of the present specification. In this regard, as recited in claim 1 of the present invention, by providing the light shield to block flashlight emitted from the flash lamp from reaching the inner surface of the chamber, oxidation of the inner surface of the chamber due to flashlight irradiation can be prevented.

The primary Moslehi reference discloses that a liner (62) made of quartz is provided inside a chamber for a heat treatment apparatus using tungsten heating lamps. However, the liner (62) of Moslehi is an environmental separation element for separating the chamber process environment and the chamber walls. This liner (62) made of quartz, allows the light from the tungsten heating lamps to pass and, therefore, does not serve as a light shield (see column 1, lines 33-39). Additionally, nothing in this reference teaches including a light shielding function in the liner (62).

The secondary Mezey reference describes providing a liner (88) removably from a housing (30) so that the liner (88) can be removed and cleaned. However, this reference only describes that "Liner 88 is arranged to protect areas of the interior surfaces of housing 30. For example,...liner 88 is arranged to as to substantially prevent deposition onto the interior surfaces of housing 30." (see column 7, lines 1-7), but it does not disclose including a light shielding function in the liner (88). That is, the liner (88) of Mezey is not a light shield, but a deposition-preventing

member for preventing deposition in the housing. Accordingly, Mezey does not disclose or suggest the concept of using the liner (88) as a light shield for blocking light emitted from a heating element (66) from reaching an inner surface of the housing (30).

The third, Mimura reference discloses a heat treatment apparatus that uses flash lamps. However, this reference only discloses a plurality of flash lamps (5) and heating means (9) built into a table (8) without any further description about a light shield for blocking flashlight emitted from the flash lamps (5).

As described, none of the cited references describe “a light shield”. Accordingly, applying the flash lamps of Mimura and the liner of Mezey to the apparatus of Moslehi still does not teach the invention of claim 1 of the present application characterized in that “a light shield is provided to block flashlight emitted from a flash lamp from reaching an inner surface of a chamber.”

Claim 8 has been amended to recite that “a liner having a roughened outer surface and an inner surface having greater smoothness than the outer surface is removably provided to the chamber to cover the side and base surfaces.” Since flash lamps irradiate very high-energy light in an extremely short time, a substrate may crack and fragment due to rapid thermal expansion (see page 3, lines 6-18 of the instant specification). According to the invention of claim 8 of the instant application, even if a substrate cracks due to flashlight irradiation, its fragments fall into the removable liner which covers not only the side surface, but also the base surface of the chamber. Thus, an easy cleaning process can be achieved by merely removing the liner from the chamber. In such cleaning process, fragments can be removed easily as the liner has a smooth inner surface.

If flashlight is irradiated with a liner having a roughened inner surface, contaminants that tend to adhere to a roughened surface rather than to a smooth surface may spread around to become a new source of contamination or may cause the liner to crack due to rapid thermal expansion. According to the invention recited in claim 8, contaminants are unlikely to adhere to the smooth inner surface of the liner, where the above-mentioned problem does not arise in flashlight irradiation. On the other hand, the roughened outer surface of the liner can block flashlight emitted from a flash lamp from reaching the inner surface of the chamber.

In contrast, the apparatus of Moslehi utilizes tungsten heating lamps, not flash lamps. Therefore, Moslehi does not have to consider the situation where flashlight irradiation causes rapid

thermal expansion and the concern about cracking of the substrate. Further, the liner (62) of Moslehi covers the inner side surfaces inside a chamber. It does not cover the base surface. The Moslehi configuration is such that, if the substrate were to crack during heat treatment, the fragments would fall directly on its base surface and result in the need for a very complex and lengthy cleaning process. Furthermore, Moslehi does not at all describe that the liner has a roughened outer surface and an inner surface having greater smoothness than the outer surface.

Mezey describes the liner (88) being removable from the housing (30). However, this reference does not at all describe that the liner has a roughened outer surface and an inner surface having greater smoothness than the outer surface. Further, the Mimura reference inherently does not describe providing a liner inside a chamber. Needless to say, Mimura does not at all describe that the liner has a roughened outer surface and an inner surface having greater smoothness than the outer surface.

Accordingly, applying the flash lamps of Mimura and the liner of Mezey to the apparatus of Moslehi still does not teach the invention of claim 8 of the instant application, which includes "a liner having a roughened outer surface and an inner surface having greater smoothness than the outer surface is removably provided to the chamber to cover the side and base surfaces."

Based on the reasons set forth above, the inventions set forth in the claims of the instant application are not obvious over the cited prior art.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 24, 2005:

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June 24, 2005  
\_\_\_\_\_  
Date of Signature

Respectfully submitted,

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